MONTHLY WEATHER REVIEW,

NOVEMBER, 1881.

(General Weather Service of the United States.)

WAR DEPARTMENT,

Office of the Chief Signal Officer,

DIVISION OF

TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

INTRODUCTION.

In preparing this REVIEW the following data, received up to November 20th, have been used, viz: the regular tri-daily weather charts, containing the data of simultaneous observations taken at 133 Signal Service stations and 14 Canadian stations, as telegraphed to this office; 179 monthly journals and 166 monthly means from the former, and 14 monthly means from the latter; 219 monthly registers from Voluntary Observers; 57 monthly registers from United States Army Post Surgeons; Marine Records; International Simultaneous Observations; Marine reports through the co-operation of the New York Herald Weather Service; monthly reports from the local Weather Services of Iowa, Nebraska and Missouri, and of the Central Pacific Railway Co.; reliable newspaper extracts; special reports.

BAROMETRIC PRESSURE.

The distribution of mean atmospheric pressure over the United States and Canada for the month of November, 1881, is shown by isobaric lines (in black) upon chart No. II. The areas of lowest mean pressure cover the Lake Superior region and the eastern portion of the Canadian Maritime Provinces, while their counterpart, the areas of highest mean pressure, occupy the eastern portion of Tennessee, the northwestern portion of the South Atlantic states, and the central portions of the Middle and Northern Plateau regions. Compared with the preceding month there has been a very decided fall in pressure at most stations north of the 42d parallel and east of the 100th meridian. This region, for the most part, had but just recovered during the month of October from a long period of deficiency, when the month of November introduced a remarkable series of areas of barometric minima in the vicinity of parallel 50° N., a study of which can be made from chart No. I. With hardly an exception, the pressure throughout the remaining portions of the country has risen, the most decided changes coinciding with the regions of highest mean pressure for the month.

Departures from the Normal Values for the Month.—Compared with the means of previous years, the mean pressure for the present month is everywhere above the normal except in the Upper Lake region, Florida Peninsula, South Pacific coast and the Upper Mississippi and Missouri valleys. The regions of greatest deficiency are the Lake Superior and extreme Northwest; departures ranging from 0.05 to 0.09 inch. The regions of greatest excess are found in New England and along the North Carolina coast; departures ranging from 0.07 to 0.14 inch. On the Pacific coast the departures range from —0.06 inch at San Diego to +0.06 inch at Red Bluff. Stations reporting a normal condition are as follows: Cheyenne, North Platte, Leavenworth, Brownsville and Winnemucca.

Barometric Ranges.—The range of pressure for the month has generally varied from 0.8 to 1.3 inches, and in the extremes from 0.3 inch at San Diego and 0.43 inch at Key West to 1.66 inches at Eastport and 1.87 inches at Deadwood. Throughout the several districts the monthly barometric ranges varied as follows: New England, from 1.17 inches at New Haven to 1.33 inches at Thatcher's Island and 1.66 inches at Eastport; Middle Atlantic states, 0.99 at Lynchburg and 1.00 at Washington to 1.11 at New York and 1.12 at Albany; South Atlantic states, 0.72 at Atlanta to 1.05 at Kittyhawk and 1.08 at Hatteras; Florida Peninsula, 0.43 at Key West to

0.70 at Cedar Keys; East Gulf states, 0.59 at Vicksburg to 0.75 at New Orleans; West Gulf states, 0.70 at Port Eads to 1.04 at Fredericksburg and Ft. Gibson and 1.09 at Mason; Rio Grande valley, 0.93 at Castroville to 1.02 at Brackettville; Ohio valley and Tennessee, 0.71 at Chattanooga to 1.13 at Champaign and 1.15 at Morgantown; Lower Lake region, 1.04 at Cleveland to 1.09 at Detroit and 1.10 at Buffalo and Rochester; Upper Lake region, 1.06 at Port Huron to 1.32 at Duluth and 1.42 at Marquette; extreme Northwest, 1.21 at Bismarck to 1.25 at Moorehead and 1.30 at Ft. Stevenson; Upper Mississippi valley, 0.85 at Cairo to 1.17 at Des Moines and 1.32 at La Crosse; Missouri valley, 1.06 at Leavenworth to 1.19 at Yankton, and 1.25 at Ft. Bennett and Huron; Southern slope, 0.47 at Coleman to 1.15 at Jacksboro and 1.20 at Henrietta; Middle slope, 0.83 at Denver to 0.99 at Dodge City; Northern slope, 0.77 at Cheyenne to 1.22 at Ft. Benton and Ft. Assinnaboine, 1.87 at Deadwood; Northern plateau, 0.58 at Lewiston to 0.95 at Boise City and 1.05 at Dayton; Middle plateau, 0.65 at Winnemucca to 0.78 at Salt Lake City; Southern plateau, 0.43 at Tucson to 0.54 at Silver City and 0.83 at Phœnix; South Pacific region, 0.30 at San Diego to 0.50 at Visalia and 0.52 at Yuma; Middle Pacific region, 0.52 at Sacramento, and 0.53 at San Francisco to 0.69 at Red Bluff; North Pacific region, 1.00 at Roseburg to 1.14 at Portland and 1.32 at Olympia.

Areas of High Barometer.—Seven distinct areas of high barometer passed over the regions covered by the Signal Service stations, all except one, (No. VII) appeared first in the extreme northern portion of the Rocky Mountain region or on the North Pacific coast, and had apparently approached this region from the North Pacific. The average course of movement was to the east after passing the eastern slope of the Rocky Mountains and to the southeast while central in the mountain districts.

No. I.—On the 1st of the month an extended area of cold and dry air appeared on the Pacific coast, moving to the southeast. The pressure rose 0.2 inch above the normal of the month in the Rocky Mountain regions on the 2d, attended by light snow and freezing weather as far south as Santa Fe. The winds shifted to northerly in the Southwest during the afternoon of the 2d, and the p. m. report of that date shows a maximum velocity of 55 miles per hour at Indianola and 48 miles at Galveston. Dangerous northerly winds continued in the Gulf of Mexico during the 3d as the pressure increased to the eastward in the Southern states. This area apparently divided on the 4th, the greater portion remaining in the Rocky Mountain regions, while a detached area moved to the northeast, following the general direction of the coast line to New England, during the 4th, 5th, 6th and 7th, and then passing over the North Atlantic. Killing frosts occurred at Vicksburg, Atlanta, Chattanooga and Charlotte and light frosts at Pensacola, Augusta and Jacksonville on the 4th, when the pressure was high in Louisiana.

No. II.—This area was central in the Northern Rocky Mountain region on the 9th, when the pressure ranged from 0.2 to 0.5 inch above the normal for the month from the Lake region westward to the Pacific coast. On the 10th, the centre was clearly located near St. Paul, and on the 11th and 12th the movement was directly eastward over the Lake region and New England, attended by light snow and killing frosts along the line of greatest pressure. After reaching the Atlantic coast the course apparently changed to the southeast and the area passed on this line beyond the limits of observation.

No. III.—The midnight report of the 13th showed a rapid increase of barometric pressure in British America and north of the Upper Missouri valley, with a rapid decrease in pressure on the Pacific coast, on the afternoon of the 14th. The barometer was 0.4 inch above the normal in the Northwest, and 0.8 inch below the normal in Washington territory; this distribution of pressure indicates that this area either originated east of the mountains in British America or passed to that position from Alaska. This area followed the general course of the Missouri valley until the 15th, and then moved eastward over the Ohio valley, the centre being near Pittsburg at 11 p. m. on that day. Severe frosts occurred on the morning of the 16th in the Middle states. The barometer continued high on the Atlantic coast during the 17th, but the pressure declined slowly as this area moved northeastward from the Middle Atlantic coast to Nova Scotia, where it was last observed.

No. IV.—During the 18th the pressure was above the normal and increasing in all the districts west of the Mississippi river, the greatest departure being reported on the North Pacific coast, when the centre of this area was located near Salt Lake. After passing the Rocky Mountains this area moved slightly north of east over the central portion of the United States, attended by very rapid changes in temperature in the central valleys, a severe norther in Texas and freezing weather as far south as Shreveport, Vicksburg and Augusta on the morning of the 20th. Dangerous northwest winds occurred on the Middle Atlantic and New England coasts on the 20th, the highest velocities being 52 miles per hour at Delaware Breakwater, 44 miles at Cape Henry, 40 miles at Block Island and 43 miles at Yarmouth—all from the northwest. This area apparently moved eastward from the Middle Atlantic coast after the 20th.

No. V.—The a. m. maps of the 21st clearly defined this area as central in the extreme Northwest and extending over the mountain regions from Mexico to British America. On the morning

of the 22d a portion of this large area became detached and moved eastward to the Lake region, leaving the barometer from 0.1 to 0.3 inch above the normal for the month in the mountain districts. On the 22d this area was central over New England and the temperature was below freezing as far south as Washington. On the 23d the pressure declined on the Atlantic coast as this area moved to the east of Halifax.

No. VI.—Appeared in the Upper Missouri valley on the afternoon of the 23d, and moved to northern Texas, where it was central at the a. m. report of the 24th. Freezing weather was reported from stations west of the Mississippi, and the winds shifted to northerly in Texas as low area No. XIII moved to the east in the Gulf. On the 24th the storm became severe in the western Gulf, when the region of greatest pressure extended over Indian territory and Kansas. The lowest temperatures of the month were reported from the Gulf and South Atlantic states, as this area passed over the Southern states. Killing frosts occurred at Indianola, New Orleans, Mobile, Pensacola and Jacksonville on the 25th. Special warnings were telegraphed by the Chief Signal Officer to New Orleans and Jacksonville, informing those interested in sugar and fruit crops of the approach of this cold wave. This area advanced to the South Atlantic coast on the 25th, but the barometer continued high in the Southern states until the 28th, when the distribution of pressure was changed by the approach of high area No. VII.

No. VII—Appeared suddenly at midnight of the 27th north of the Lake region and advanced from Hudson's Bay over the St. Lawrence valley and New England, attended by the lowest temperatures of the month in the northeastern portion of the United States. After reaching the coast the pressure increased to the southward on the 29th, after which the pressure declined, with rising temperature and northeast to southeast winds at stations along the Atlantic coast.

No. VIII.—The history of this area, as it affects the stations east of the Rocky Mountains, will be given in the December REVIEW. On the 30th the pressure was high in the Plateau regions and the indications were that a cold wave was approaching the Mississippi valley.

Areas of Low Barometer.—Sixteen barometric depressions appeared within the limits of the stations of observation during the month of November. Three of these passed from the tropics to the Gulf states, three apparently originated in the Southwest, and three probably passed from the Pacific across the Rocky Mountains to the Lake region. Chart No. I shows that these disturbances occurred in latitudes north of the mean track of November storms.

No. I.—This slight depression passed north of the Lake region, on the 1st, unattended by marked atmospheric changes within the United States. At midnight of the first the pressure was high in the western districts, and on the Atlantic coast these areas of high barometer were separated by a trough of low pressure in the Mississippi valley. With the advance of high area No. I, this trough of low pressure was divided and formed low areas Nos. II and III, the former central in Texas on the morning of the 2d, and the latter central in the Upper Lake region.

No. II—Developed in the Southwest on the 1st, attended by rain and warm southerly winds and disappeared on the 2d in advance of high area No. I, which caused very rapid changes in temperature and high northerly winds over the region covered by this depression on the 2d.

No. III.—This storm appeared in the Upper Lake region on the morning of the 2d, and increased in severity as the centre passed northeast to the St. Lawrence valley. The pressure at the centre of this storm declined as the disturbance moved eastward and the winds became dangerous on the lakes after shifting to westerly. The sudden fall of temperature and the area of precipitation attending this storm extended over all districts east of the Mississippi. Heavy snows fell in the Lake region, where brisk and high westerly winds continued until the 4th, when the centre of disturbance was near Eastport. Northwesterly gales occurred on the North Atlantic coast north of Cape Hatteras on the night of the 3d. Cautionary signals were ordered from eight to twenty-four hours in advance of this storm at stations on the Atlantic coast, but the cautionary signals ordered for the lake ports were in some cases late. This storm crossed the St. Lawrence valley on the night of the 3d, and increased in energy until the night of the 4th, when the pressure at the centre had fallen to 29.04 inches, at Anacosti Island, with the wind reported as a gale from the south at 11 p. m. The gale continued at this station on the 5th, the wind shifting to westerly, and at Farther Point the wind increased to 45 miles per hour This storm apparently moved to the southeast after leaving the Gulf of St. Lawrence and probably moved to the north of the track of vessels passing from Europe to America.

No. IV.—Was central in the Lower Missouri valley on the afternoon of the 4th, while low area No. III was passing to the northeast of New England. This disturbance was first observed in the Northern Rocky Mountain region on the night of the 3d; the track of the centre being southeast until it reached the Mississippi valley, after which the course was northeast over the Lake region and St. Lawrence valley. Light snow and rain fell at stations north of parallel 40° as this depression passed to the east during the 4th and 5th. The highest winds occurred on the Lower Lakes, the track of disturbance being confined to narrow limits. The highest velocity reported was 36 miles per hour from the southwest at Sandusky.

No. V.—The p. m. report of the 5th indicated the presence of a disturbance in the West Gulf, and the midnight report of the same date shows that during the preceding eight hours the wind reached a velocity of 32 miles per hour at Galveston and 36 miles at Indianola. This storm moved to the northeast, the centre passing near Port Eads, at the mouth of the Mississippi, during the 6th. Very heavy rains occurred in the Gulf states, and dangerous winds were reported in the East Gulf. Pensacola reported a velocity of 40 miles per hour from the southeast on the night of the 6th. This storm disappeared as a cyclonic disturbance after reaching the East Gulf states.

No. VI.—This storm passed from the Pacific east of Portland on the 5th causing heavy rains in Oregon and Washington territory. The barometer fell to 29.47 inches at Olympia on the afternoon of the 5th, when the centre was near that station. Heavy snows occurred in Montana and Idaho on the 6th, as this depression passed over the mountains. On the morning of the 7th the centre of greatest depression was located near Pembina, where the barometer indicated a pressure of 29.34 inches. The p. m. chart of this date exhibits a trough of low pressure extending from Texas to British America; the barometer being high in New England and the winds in all districts east of the Mississippi from south to east, apparently under the influence of this depression. The storm continued to move eastward and passed over the Lake region on the 8th, causing high winds at all stations on the Upper Lakes and Lake Erie. The maximum velocities occurred after the winds had veered to the west. This storm crossed from the Pacific to the Atlantic in five days and eight hours, approximately on the parallel of the northern boundary of the United States, and it left the Atlantic coast attended by severe gales in the Northeastern Provinces. These gales continued during the 10th and 11th after the centre of disturbance had passed east of the coast line. Cautionary signals were displayed at the Lake ports and on the Atlantic coast north of Cape Henry, giving warning of the approach of this storm.

No. VII.—The distribution of barometric pressure over the United States on the 10th indicated the development of a storm south of the Gulf states, where this area was probably central. The p. m. report of the 10th pl ced the centre of this disturbance in the Rio Grande valley near to and northeast of Brownsville, and succeeding reports indicated the advance of this storm to the northward immediately toward the high area, which then extended over the Lake region. This storm moved northerly until the centre reached a point near Omaha on the afternoon of the 11th and then moved to the northeast. Heavy rains fell on th 11th and 12th in the Mississippi and the Ohio valleys and Lake region, and severe gales occurred at the Lake stations as the centre passed from northern Iowa over Lake Superior. Cautionary signals were displayed at all stations on the lakes in advance of this storm. The maximum velocities as reported were as follows: Milwaukee, 45 miles; Grand Haven, 40 miles; Alpena, 42 miles. The above wind velocities indicate the severity of the storm in the Lake region. The Cautionary signal at Chicago was not justified at this station, the highest velocity which occurred during the storm, being 22 miles per hour; but vessels attempting to leave this port were compelled to return. This depression advanced rapidly to the Lower St. Lawrence valley during the 12th and 13th, followed by clearing, colder weather in the Mississippi valley and light rains in the Lake region and the Middle states. The barometer continued to fall at the centre as this storm advanced to the east, and when last observed on the morning of the 14th the pressure was 29.43 inches at Anacosti, with the wind reported as a gale from the west.

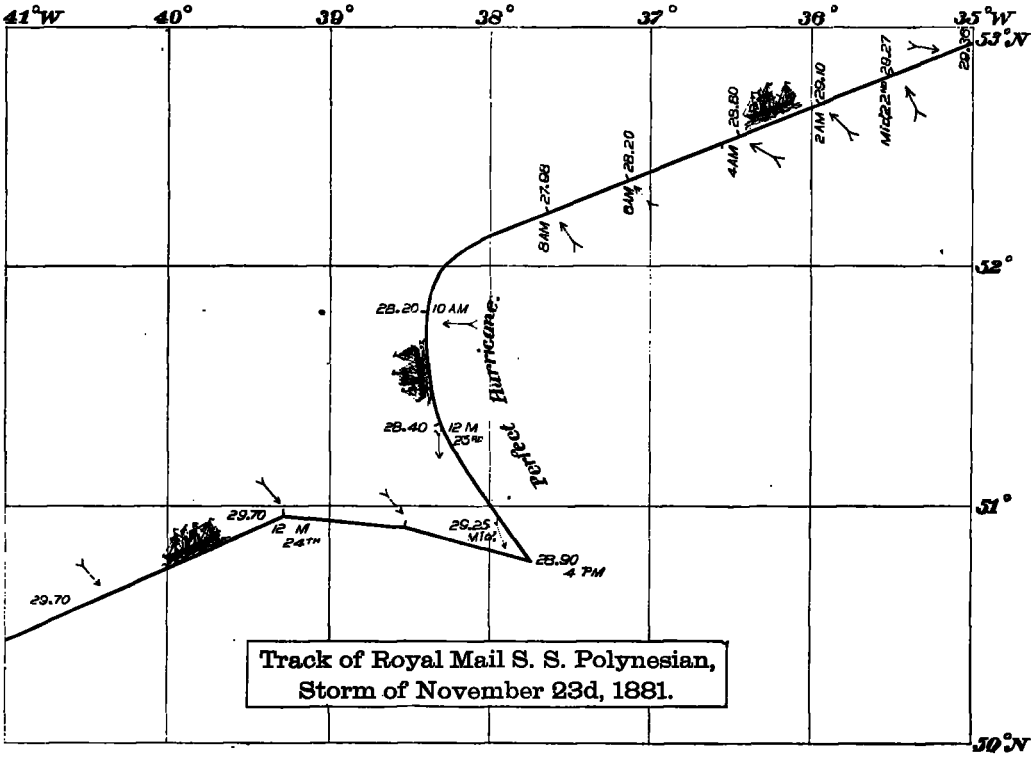
No. VIII.—The a. m. report of the 14th indicated the presence of this depression off the North Pacific coast, the barometer at Portland then reading 29.43 inches. The midnight report of the 14th showed that threatening weather and rain had extended as far south as San Francisco, and that all winds on this coast had veered to southerly. This depression probably crossed the Rocky Mountains, but the chart of barometric departures indicated that two depressions existed in this region on the morning of the 14th, and the one in advance, has been traced continuously for each telegraphic report, and therefore marked as a separate storm.

No. IX.—Central in the Saskatchewan region at midnight of the 14th the storm passed southeastward, following the course of the Missouri valley until the a. m. report of the 16th, when the centre of disturbance was located near Yankton. From this point the course changed to the northeast, and during the 17th this storm increased in energy as it passed over the Lake region and thence to the eastward. The increase of pressure in the western quadrants was very rapid, and the temperature fell from 20° to 30° in the Northwest. This storm continued its easterly movement after leaving the Lake region, but became much enlarged as it approached the northeastern coast. The lowest reading of the barometer observed was 29.12 inches at Anacosti on the afternoon of the 18th, when the stations on the Atlantic coast north of Cape Hatteras were within the limits of this depression, the winds being from brisk to high and from the southwest at stations along the coast.

No. X.—This storm developed in Texas during the night of the 17th, and was central near Denison on the morning of the 18th, the isobar of 29.90 inclosing the area and forming an elongated ellipse with the longer axis pointing in the direction of the storm movement. This de-

pression was forced rapidly to the east by the high area which was advancing from the Upper Missouri valley. The rush of cold air from the north caused a marked depression in temperature at stations on the eastern slope of the Rocky Mountains on the morning of the 18th. The 3 p. m. report of this date shows temperatures of 77° at Memphis, 33° at Fort Gibson, 56° at St. Louis and 25° at Leavenworth. Very heavy rains fell on the 18th, in Missouri, Illinois, Indiana and Kentucky, causing damaging floods in the tributaries of the Ohio. Snow and sleet continued in the northern districts during the 19th, as this storm centre passed over New York and New England. The winds increased in force on the Lower Lakes near the centre of disturbance and on the Middle Atlantic coast after shifting to the northwest. The highest velocities reported were as follows: Sandusky, 48 miles from the west; Delaware Breakwater, 40 to 52 miles during the 36 hours ending at 7 a. m., November 20th. The following reports, furnished through the co-operation of the New York Herald Weather Service, indicate the presence of this storm as it passed eastward over the ocean. S. S. *Gallia*, 20th, 7. a. m., in 45° 13′ N., 44° 31′ W., 29.75, W., force 5, high WNW. sea, overcast and rain; noon, in 45° 02′ N., 45° 03′ W., 29.70, SW., force 5, high WNW. sea, overcast and heavy rain. 21st, 7. a. m., in 43° 55′ N., 48° 19′ W., 30.15, NNW., force 8, cloudy weather, stormy gales and hail; noon, in 43° 40′ N., 49° W., 30.22, NNW., force 8, high gales and hard squalls with hail. S. S. *Wyoming*, 20th, 7. a. m., in 47° 30′ N., 41° 50′ W., 29.60, NNW., force 7, confused sea, overcast and cloudy; 3 p. m., in 47° N., 44° W., 29.10, ESE., force, 4, confused sea, gloomy weather, sleet and snow. 21st, 7 a. m., in 45° 45′ N., 47° 25′ W., 30.00, W., force 9, overcast and cloudy; 3 p. m., in 45° 20′ N., 48° 58′ W., 30.13, WSW., force 7, overcast and cloudy. S. S. *City of Chester*, 21st, 10.26 a. m., in 50. 34′ N., 25° 20′ W., 28.20, SSW., force 9, high confused sea, dark cloudy weather with thunder and lightning; at 1.20 p. m., wind suddenly shifted in a terrific squall from SW. to NW., and blew with hurricane force for three hours. 22d, 10.10 a. m., in 50° 15′ N., 29° 40′ W., 29.40, W., force 7, partly cloudy weather. 23d, 9.50 a. m., in 49° 10′ N., 44° 20′ W., 27.97, SW., force 12, dark heavy clouds with violent squalls of rain and hail. 24th, 9.40 a. m., in 49° N., 36° 30′ W., 29.62, W., force 10, partly cloudy weather with violent squalls of rain and hail. S. S. *Italy*, 24th, in 48° 34′ N., 31° 50′ W., hurricane from N. to NW., barometer fell from 29.60 to 28.20.

Nos. XI and XII.—Were observed in the region north of Dakota on the 20th and 22nd and moved directly east, north of the Lake region, causing slight changes in the atmospheric conditions over the United States. No. XI developed great energy as it approached the Newfoundland coast. Violent gales occurred at Father Point, Yarmouth and in the Atlantic east of these stations. This storm probably continued its easterly course over the Atlantic as is indicated by the reports from the steamship *Polynesian* on the 23d in the latitude and longitude given in the accompanying chart:



Track of Royal Mail S. S. Polynesian, Storm of November 23d, 1881.

The track of this vessel with the direction of the wind and the readings of the barometer are also

given on this chart as reported. The Chief Signal Officer takes this occasion to express his high appreciation of the valuable reports and diagrams furnished by Commander R. Brown of the "Allan" Royal Mail S. S. *Polynesian*. No. XII passed to the east off the coast on the 24th as a severe storm, the barometer at Sydney falling as low as 29.14 and that at Anacosti to 29.19. The following report taken under the direction of Commander Jules Ueberweg of the S. S. *Nederland* of the Red Star Line, indicates that this storm continued its easterly course over the Atlantic to 51° N., 22° W. This vessel was five days in passing from longitude 23° to longitude 30°. The following observations were taken on this vessel during the storm:

Date.	Wind.	Course.	Distance.	Lat.	Long.	Bar.	Temp	Remarks.
Nov. 27th.....	WNW.	S. 86° 27′, W.	210 miles.	50° 57′	22° 52′	29.18	43°	Violent and terribly high sea.
Nov. 28th.....	NW.			50° 35′	21° 56′	29.57	42°	Violent and terribly high sea.
Nov. 29th.....	NW. to WSW.			50° 47′	24° 58′	29.18	45°	Stormy and boisterous; furious high sea.
Nov. 30th.....	WSW. to NW.			50° 43′	25° 46′	29.40	44°	Stormy and boisterous; furious high sea.
Dec. 1st.....	WNW.			50° 47′	28° 57′	29 40	45°	Wind and sea abating gradually

The following reports furnished through the co-operation of the New York Herald Weather Service, indicate the presence of this storm as it passed eastward over the ocean. S. S. *Wyoming*, 24th, 7 a. m., in 41° 26′ N., 63° 46′ W., 29.38, SW., force 7, high westerly sea, gloomy weather and rain; 3 p. m., in 41° 05′ N., 65° 40′ W., 29.42, WNW., force 6, overcast and rain. 25th, 7 a. m., in 40° 30′ N., 69° 08′ W., 30.08, WNW., force 7, partly cloudy weather. S. S. *Gallia*, 24th, 7 a. m. in 41° 52′ N., 66° 17′ W., 29.40, S., force 4, overcast and rain; noon, in 41° 45′ N., 67° 40′ W., 29.30, NW., force 4, cloudy weather and rain.

No. XIII.—Appeared in the Gulf of Mexico, south of the mouth of the Mississippi river, on the afternoon of the 22d. This storm became well defined, and passed northeast over Florida, causing high winds in the East Gulf. Signals were ordered for stations on the Atlantic coast as far north as Norfolk, but the depression either filled up or passed rapidly to the east off the South Atlantic coast, causing but slight disturbances at stations between Cape Hatteras and Jacksonville. The signals ordered for stations on the Gulf coast were justified; those ordered for Jacksonville, Savannah, Charleston and Wilmington were not justified at the stations. A vessel attempted to leave port at Jacksonville but was compelled to return.

No. XIV.—First observed in British America northwest of Ft. Garry on the 24th, and by the morning of the 25th it had moved southeastward to Lake Superior, causing high winds and snow in the Lake region. On the morning of the 26th the centre of disturbance was north of Lake Ontario, but generally fair weather continued in the districts on the Atlantic coast and south of the Lake region. This storm was followed by a slight depression, which developed into a severe storm in the St. Lawrence valley on the night of the 27th. The rapid advance of high area No. VII from the Hudson Bay region, caused a rapid increase in the barometric gradient to the west of the centre of this secondary storm, and high westerly winds were reported from Sydney, Yarmouth, and other stations in that region. The following reports furnished through the co-operation of the New York Herald Weather Service indicate the presence of this storm as it passed eastward over the ocean: S. S. *Italy*, 26th, in 47° 44′ N., 38° 15′ W., 29.10, heavy westerly gale, with squalls and very high sea. 27th, in 47° 09′ N., 41° 03′ W., heavy NNW. gales, slightly abating, with hail squalls and cloudy weather. S. S. *Republic*, *(?)* 26th, in 51° N., 24° 15′ W., 28.56, WSW., force 11, terrific storm, violent squalls and high sea. 27th, in 50° 35′ N., 26° 34′ W., 29.31, WNW., force 10, terrific gale, violent squalls and high sea.

No. XV.—Advanced from the Upper Missouri valley on the afternoon of the 27th, but probably originated west of the Rocky Mountains. The centre of this storm passed far to the north of the Lake region, but the southern half of the depression included within its limits all districts north of Tennessee and Virginia. As the centre passed to the east the weather continued fair, except at extreme northern stations, with rising temperature and south to east winds.

No. XVI.—Developed in the Southwest on the 29th, and after passing over the Mississippi valley and Lake region as an area of rain and snow it was central north of Lake Erie at the close of the month. The temperature fell below freezing in the Rocky Mountain regions as far south as El Paso, as this storm moved to the east of the Mississippi. Cautionary off-shore signals were ordered on the 30th for Indianola and Galveston in anticipation of the light norther, which occurred in Texas on Dec. 1st.

INTERNATIONAL METEOROLOGY.

International charts Nos. IV and V accompany the present REVIEW. The former is published for September, 1879, and continues the series of this chart commenced in January, 1877. chart No. V is prepared for the month of December, 1879, and continues the series of this chart commenced in November, 1877.